Weekly Report for 06/15/2015

Highlights

• Prepared talk on Injector requirements for the CD1 review with CY Yao, with input from R. Lindberg and J. Calvey, and presented it at a dry run for feedback. (Kathy Harkay)

• Paper on SCU beam loss diagnostics (with J. Dooling and Y. Ivanyushenkov) was published in the ICFA Beam Dynamics Newsletter No. 66. (Kathy Harkay)

APS Renewal and Upgrade

• Convened Injector Working Group meeting (6/22). Main theme was Booster RF. Speaking were CY Yao, D. Horan, and T. Berenc. (Kathy Harkay)

• Prepared talk on Injector requirements for the CD1 review, with CY Yao. Borrowed material from CY Yao's talks at MAC review (Feb 2015) and APS-U PHysics review (Feb 2014), and from my own introduction talk for the Injector WG (May 2015). Requested slides, giving guidance, on booster modeling from R. Lindberg and on PAR ion effects from J. Calvey. Incorporated revisions based on feedback at a dry run. (Kathy Harkay)

• Attended APS-U Physics meeting. (Kathy Harkay)

• Obtained factor of 2 level agreement between the PAR tune measurement and prediction from the ion simulation code, by including multiple ionization and a realistic beam chirp in the simulation. Also studied the effect of beam size and pressure variation on the simulated tune shift. (Joe Calvey)

• Discussed ion trapping in the APS-U with K. Harkay. Compared my results to previous work done by Y. Chae. (Joe Calvey)

• Provided slides on ion effects to K. Harkay and R. Lindberg for their Director's review talks. (Joe Calvey)

• Continue on BTS line optics design, found a preliminary result. (Aimin Xiao)

• Discussed with Melika on how to make a kickmap for 3PW. (Aimin Xiao)

• Summarized injection simulation results (scan over parameter space). (Aimin Xiao)

• MOGA optimization of nominal and alternate upgrade lattices with reverse bends (Yipeng Sun)

• MOGA scripts development for tracking with different conditions (Yipeng Sun)

• Prepare for APSU July review (Yipeng Sun)

MCR Operations

Linac Operations

• worked on the LLRF measurement of 3G2 (0.200" shims installed with 0.6 inch lbs torque). The goal is to find out the operation temperature for the gun, estimated temperature is 54C from previous measurements at different shim sizes. (Yin-e Sun)

APS Machine Studies

Storage Ring Studies

• Carried out abort kicker studies with low (1-2 mA) beam current, single bunch, with J. Dooling, and confirmed that the beam loss location is around Sector 39, as expected. (Kathy Harkay)

• Mapped out abort kicker waveform using BPM histories for 6 evely spaced bunches (0.5

mA/bunch), with V. Sajaev. (Kathy Harkay)

• Carried out abort kicker studies at higher (20 mA) beam current for HP radiation survey, with J. Dooling and J. Vacca. (Kathy Harkay)

• Performed CPU study to understand coupling variation. (Aimin Xiao)

• Tune map measurement. (Yipeng Sun)

• Prepare for orbits on resonances. (Yipeng Sun)

PAR Studies

• With C. Yao and K. Harkay, investigated the effect of drive amplitude on the PAR tune measurement. Discovered that the drive was enabled for the full cycle. Obtained an RF switch to properly gate the drive signal. (Joe Calvey)

APS Machine Research and Development

Storage Ring Research and Development

• Marked dosimeter locations with J. Dooling and J. Vacca for abort kicker test (from Sector 39 straight to S40:AM). (Kathy Harkay)

• Requested drawings from D. Skiadopouplos for the new SCU0 vacuum chamber and discussed the two SS transition options with X. Sun. (Kathy Harkay)

• Met with J. Hoyt to discuss S38 vertical scraper temperature history with 100 mA and high current. Showed him how to access logged data. (Kathy Harkay)

• Made a report to ASD management on status of design and analysis of new SCU0 vacuum chamber. (Kathy Harkay)

Linac Research and Development

• checked out the beamline components around the to-be-installed Tcav location inside the linac. Suggested to move the Tcav downstream by a few inches in order to add a BPM upstream of the TCAV for beam position measurement. We have existing BPM hardware and will use one of the control card of a BPM in the linac that were never used (L5:FCN). (Yin-e Sun)

• checked the waveguide configuration in the penetration to the linac tunnel, in hope of to find a spot to insert RF windows to protect SLEDs when the sagged linac accelerating structures are to be replaced with straightened structures. (Yin-e Sun)

• Worked on PC Gun linac lattice using ASTRA/elegant. (Yin-e Sun)

Other Research and Development

• worked on the numerical simulations using GPT of a double emittance exchanger. (Yin-e Sun)

APS Machine Software

Storage Ring

• put ID01ds (SCU1) back to blade rate and offset installation since it works now. And changed the gap threshold for ID01ds to 35mm per Louis' request. (Hairong Shang)

• per Nick's request, filtered out S27 ID from APSRemoveIDfromDefaultConfigs so that operators

won't be able to remove S27 ID GRID from orbit control before they do steering (Hairong Shang)

• modified SRIDSteering to not check the inUse BPMs for S27 ID because GRID BPMs can be steered and left in orbit correction after steering. (Hairong Shang)

• added restore SRXrayBPM system to RTFB reboot pem, ready for test. (Hairong Shang)

• added preferred choice configuration for SRXrayBPMWaveform SCR and installed "User Operation" reference. (Hairong Shang)

Injectors

• setup booster DC bcontrol controllaw files, and tested bcontrol, it ran successfully for booster DC ramp. (Hairong Shang)

• tested booster BSP100 BPM with CY, improved the SetBoosterSingleBumpAmplitude script so that it works with any ramp table. collected booster BPS100 BPM data, the result showed that the BPMs in 2 time-region responded corrector bumps, and it was found that the BPM timing was not correctly setup. Will continue testing it after the BPM timing correction. (Hairong Shang)

General

• SaveCompareRestore failed because of the new ttk widget library, informed Bob Soliday. (Hairong Shang)

• studied XiaoBiao Huang's (in SLAC) online optimization method written in matlab, it is actually powell's optimization not the global optimization. will continue studying it and may test with our machine. (Hairong Shang)

Publications, papers and report

• Paper on SCU beam loss diagnostics (with J. Dooling and Y. Ivanyushenkov) was published in the ICFA BD Newsletter No. 66. (Kathy Harkay)

• Made major revisions to QE paper, with L. Boon. Added references, expanded the introduction, added numerous comments for Laura, and started working on the theory section. (Kathy Harkay)

Meetings, workshops, conferences, committees, LMS related, and reviews

• prepared and presented "APS RF Guns" at the group physics meeting. (Yin-e Sun)

Education, Mentoring and outreach

• continued discussions with colorado state university colleagues on thermal cathode studies. (Yin-e Sun)